Claims Listing

1. (Currently amended) An antenna structure comprising:

at least one antenna element, the at least one antenna element having at least one taper; and

a symmetrical finite ground plane coupled with the at least one antenna element;

wherein the at least one antenna element comprises a traveling wave antenna supporting a phase velocity greater than the speed of light.

2. (Canceled) The antenna structure of Claim 1, wherein the at least one antenna element comprises a travelling wave antenna supporting a phase velocity greater than the speed of light.

3. (Original) The antenna structure of Claim 1, wherein the taper comprises a linear profile, a linear constant profile, a broken-linear profile, an exponential profile, an exponential constant profile, a tangential profile, a step-constant profile, or a parabolic profile.

4. (Original) The antenna structure of Claim 1, wherein the antenna structure supports a cigar-like directional three-dimensional beam pattern and a butterfly wing-like directional three-dimensional beam pattern.

5. (Original) The antenna structure of Claim 1, wherein the at least one antenna element is positioned at an angle from the symmetrical ground plane.

6. (Previously presented) The antenna structure of Claim 5, wherein the angle is about 90 degrees with respect to the x-, y- and z- axes.

7. (Original) The antenna structure of Claim 1, wherein the at least one antenna element is coupled with the symmetrical ground plane by means of an unbalanced impedance.

8. (Original) The antenna structure of Claim 7, wherein the unbalanced impedance comprises a coaxial cable.

9. (Original) The antenna structure of Claim 7, wherein a first conductor of the unbalanced impedance mechanically couples the at least one antenna element with the symmetrical ground plane.

10. (Original) The antenna structure of Claim 1, wherein the symmetrical ground plane is disk shaped.

11. (Currently Amended) An antenna structure comprising:

an array of at least two antenna elements, each antenna element having at least one taper;

a symmetrical finite ground plane; and

an unbalanced impedance for coupling the array of at least two antenna elements with the symmetrical ground plane;

wherein at least one antenna element of the array comprises a traveling wave antenna supporting a phase velocity greater than the speed of light.

12. (Canceled) The antenna structure of Claim **11**, wherein at least one antenna element of the array comprises a travelling wave antenna supporting a phase velocity greater than the speed of light.

13. (Original) The antenna structure of Claim **11**, wherein the taper of at least one antenna element of the array comprises a linear profile, a linear constant profile, a broken-linear profile, an exponential profile, an exponential constant profile, a tangential profile, a step-constant profile, or a parabolic profile.

14. (Original) The antenna structure of Claim **11**, wherein each antenna element of the array supports a cigar-like directional three-dimensional beam pattern and a butterfly wing-like directional three- dimensional beam pattern.

15. (Original) The antenna structure of Claim **11**, wherein each antenna element of the array is positioned at an angle from the symmetrical ground plane.

16. (Previously presented) The antenna structure of Claim 15, wherein the angle for each antenna element is about 90 degrees with respect to the x-, y- and z- axes.

17. (Original) The antenna structure of Claim 11, wherein the unbalanced impedance comprises a coaxial cable.

18. (Original) The antenna structure of Claim 17, wherein a first conductor of the unbalanced impedance mechanically couples each antenna element of the array with the symmetrical ground plane.

19. (Original) The antenna structure of Claim 11, wherein the symmetrical ground plane is disk shaped.

20. (Original) The antenna structure of Claim 11, further comprising a slow wave antenna to widen the directivity of the antenna structure.

21. (Currently Amended) An apparatus comprising:

a transceiver; and

an antenna structure for radiating or capturing electromagnetic energy from or to the transceiver comprising:

at least one antenna element having at least one taper, the taper comprising a linear profile, a linear constant profile, a broken-linear profile, an

exponential profile, an exponential constant profile, a tangential profile, a step-constant profile, or a parabolic profile;

a symmetrical disk shaped finite ground plane, the at least one antenna element being positioned at an angle from the symmetrical disk shaped finite ground plane; and

an unbalanced impedance for coupling the at least one antenna element with the symmetrical disk shaped finite ground plane;

wherein the at least one antenna element comprises a traveling wave antenna supporting a phase velocity greater than the speed of light.

22. (Original) The apparatus of Claim **21**, wherein the at least one antenna element supports a cigar-like directional three-dimensional beam pattern and a butterfly wing-like directional three- dimensional beam pattern.

23. (Previously presented) The antenna structure of Claim **21**, wherein the angle is about 90 degrees with respect to the **x**-, **y**- and **z**- axes.

24. (Original) The antenna structure of Claim **21**, wherein the unbalanced impedance comprises a coaxial cable.

25. (Original) The antenna structure of Claim **21**, wherein a first conductor of the unbalanced impedance mechanically couples the at least one antenna element with the symmetrical ground plane.